CLAIMS

I claim:

1. A method of converting cellulose in cellulose sausage casings to lactic acid comprising the step of:

treating spent cellulose sausage casings with cellulase and a lactic acid producing microorganism under suitable conditions and for a period of time sufficient to allow conversion of at least a portion of the cellulose to lactic acid.

2. The method of claim 1, wherein the microorganism is selected from the group consisting of *Lactobacillus* species.

3. The method of claim 2, wherein the microorganism is selected from the group consisting of *Lactobacillus brevis, Lactobacillus bulgaricus, Lactobacillus delbrueckii, Lactobacillus delbrueckii* subsp. *lactis, Lactobacillus delbrueckii* subsp. *bulgaricus, Lactobacillus fermentum, Lactobacillus lactis, Lactobacillus pentosus, Lactobacillus plantarum*, and *Lactobacillus thermophilus.*

4. The method of claim 1, wherein the cellulase is selected from the group consisting of a partially purified cellulase and cellulase contained in or obtained from a solid substrate cultivation of a cellulolytic fungus.

5. The method of claim 4, wherein the cellulase contained in or obtained from a solid substrate cultivation of a cellulolytic fungus is selected from the group consisting of *Trichoderma reesei*, *Rhizopus oryzae*, and *Aspergillus niger*.

6. A method of converting cellulose in cellulose sausage casings to ethanol comprising the step of:

treating spent cellulose sausage casings with cellulase and an ethanol producing microorganism under suitable conditions and for a period of time

sufficient to allow conversion of at least a portion of the cellulose to ethanol.

7. The method of claim 6, wherein the cellulase is selected from the group consisting of a partially purified cellulase and cellulase contained in or obtained from a solid substrate cultivation of a cellulolytic fungus.

8. The method of claim 6, wherein the cellulase contained in or obtained from a solid substrate cultivation of a cellulolytic fungus selected from the group consisting of *Trichoderma reesei*, *Rhizopus oryzae*, and *Aspergillus niger*.

9. The method of claim 6, wherein the microorganism is selected from the group consisting of *Kluveromyces marxianus* and *Saccharomyces cerevisiae*.

10. A method of producing an enzyme from the solid substrate cultivation of a cellulolytic fungus comprising the steps of:

(a) inoculating spent cellulose sausage casings with a cellulolytic fungus; and

(b) incubating the inoculated casings of step (a) under suitable conditions and for a period of time sufficient to allow the fungus to produce an enzyme selected from the group consisting of cellulase, xylanase, hemicellulase, and pectinase.

11. The method of claim 10 wherein the cellulolytic fungus of step (a) is selected from the group consisting of *Trichoderma reesei*, *Rhizopus oryzae*, and *Aspergillus niger*.

12. A method of producing feed grade protein from the solid substrate cultivation of a cellulolytic fungus comprising the steps of :

(a) inoculating spent cellulose sausage casings with a cellulolytic fungus; and

(b) incubating the inoculated casings of step (a) under suitable conditions and for a period of time sufficient to allow the fungus hydrolyze at least a portion

of the cellulose to glucose and to convert at least a portion of the glucose to protein.

13. The method of claim 12 wherein the cellulolytic fungus of step (a) is selected from the group consisting of *Trichoderma reesei*, *Rhizopus oryzae*, and *Aspergillus niger*.